

CLMPTO

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1. A method of forming an insulating film comprising silicon oxide formed over a glass substrate,

5 wherein the insulating film includes halogen at a concentration of $5 \times 10^{20} \text{ cm}^{-3}$ or less and carbon at a concentration of $5 \times 10^{19} \text{ cm}^{-3}$ or less which are detected by second ion mass spectroscopy.

2. (Amended) A method according to claim 1, wherein the halogen is fluorine or chlorine.

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3. A method according to claim 1, wherein the insulating film includes 10 carbon at a concentration of $1 \times 10^{18} \text{ cm}^{-3}$ or less which is detected by the second ion mass spectroscopy.

4. A method according to claim 1, wherein said insulating film is a gate insulating film.

5. A method according to claim 1 wherein the insulating film is an 15 insulating film in a thin film transistor.

6. A method according to claim 1, wherein the insulating film covers an even surface over the glass substrate.

7. A method according to claim 1, wherein the insulating film includes halogen at a concentration of $1 \times 10^{21} \text{ cm}^{-3}$ or more.

20 8. A method of producing a semiconductor device, said method comprising the steps of:

forming a crystalline semiconductor island formed over a glass substrate; and

forming an insulating film including silicon oxide formed to cover the crystalline semiconductor island,

5 wherein the insulating film includes halogen at a concentration of $5 \times 10^{20} \text{ cm}^{-3}$ or less and carbon at a concentration of $5 \times 10^{19} \text{ cm}^{-3}$ or less.

9. A method according to claim 8, wherein the concentrations of halogen and carbon are detected by secondary ion mass spectroscopy.

10. (Amended) A method according to claim 8, wherein the halogen is [fluorine or] chlorine.

11. A method according to claim 8, wherein the insulating film is formed by plasma chemical vapor deposition using an organic silane.

12. A method according to claim 8, wherein the insulating film includes halogen at a concentration of $1 \times 10^{21} \text{ cm}^{-3}$ or more.

13. (Amended) A method of fabricating a thin film transistor, said method comprising—
the steps of:

forming a crystalline semiconductor island formed over a glass substrate;

forming a silicon oxide film formed [to cover] over the crystalline semiconductor island;

and

forming a conductive film including at least one aluminum, titanium, and titanium nitride, said conductive film being formed on the silicon oxide film,

wherein the silicon oxide film includes halogen at a concentration of $5 \times 10^{20} \text{ cm}^{-3}$ or less and carbon at a concentration of $5 \times 10^{19} \text{ cm}^{-3}$ or less.

14. (Amended) A method according to claim 13, wherein the halogen is [fluorine or] chlorine.

15. A method according to claim 13, wherein the silicon oxide film is formed by plasma chemical vapor deposition using an organic silane.

§ 16. A method according to claim 13, wherein the silicon oxide film includes halogen at a concentration of $1 \times 10^{17} \text{ cm}^{-3}$ or more.

17. A method of fabricating a thin film transistor, said method comprising the steps of:

10 forming a crystalline semiconductor island formed over a glass substrate;

15 forming a gate insulating film including silicon oxide formed on the crystalline semiconductor island; and

forming a gate electrode formed on the insulating film,

wherein the gate insulating film includes halogen at a concentration

of $5 \times 10^{17} \text{ cm}^{-3}$ or less and carbon at a concentration of $5 \times 10^{19} \text{ cm}^{-3}$ or less.

18. (Amended) A method according to claim 17, wherein the halogen is [fluorine or] chlorine.

19. A method according to claim 17, wherein the gate insulating film is formed by plasma chemical vapor deposition using an organic silane.

20. 20. A method according to claim 17, wherein the gate insulating film includes halogen at a concentration of $1 \times 10^{17} \text{ cm}^{-3}$ or more.

-21. A method according to claim 1, wherein the halogen is fluorine.

22. A method according to claim 8, wherein the halogen is fluorine.
23. A method according to claim 10, wherein the halogen is fluorine.
24. A method according to claim 17, wherein the halogen is fluorine.
25. A method of fabricating a thin film transistor, said method comprising the steps of:
 - forming at least a thin film transistor including a crystalline semiconductor island, a gate electrode adjacent to the crystalline semiconductor island with a gate insulating film interposed therebetween;
 - forming an interlayer insulating film comprising silicon oxide over the thin film transistor,wherein the interlayer insulating film includes halogen at a concentration of $5 \times 10^{26} \text{ cm}^{-3}$ or less and carbon at a concentration of $5 \times 10^{19} \text{ cm}^{-3}$ or less.
26. A method according to claim 25, wherein the halogen is chlorine.
27. A method according to claim 25, wherein the halogen is fluorine.
28. A method according to claim 25, wherein the interlayer insulating film is formed by plasma chemical vapor deposition using an organic silane.
29. A method according to claim 25, wherein the interlayer insulating film includes halogen at a concentration of $1 \times 10^{23} \text{ cm}^{-3}$ or more.

--30. A method of manufacturing a semiconductor device comprising:
forming a gate insulating film comprising silicon oxide on
a channel region by plasma CVD using a reactive gas comprising at least an
organic silane,
wherein said gate insulating film contains halogen at a
concentration of $5 \times 10^{20} \text{ cm}^{-3}$ or less and carbon at a concentration of $5 \times 10^{18} \text{ cm}^{-3}$ or less. --